

aware, of course, that some workers still insist that hybridization (actual or potential) with the production of fertile offspring is itself disproof of specific distinctness. This criterion, if rigidly applied to American *Quercus*, would probably reduce that multitudinous and extremely diverse assemblage to the ridiculous extreme of three "species", one for each of the subgenera.

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THE ALLOPOLYPLOID STIPA LATIGLUMIS¹

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Stipa latiglumis Swallen is a rare endemic Californian species described originally by Swallen (1933) from Yosemite Valley. It is a tufted perennial, resembling in its gross morphology such common species as *S. californica* Merr. & Davy and *S. elmeri* Piper & Brodie. Like these two species, it has pubescent lemmas which have the hairs markedly longer at the summit, and awns which bear spreading or ascending hairs on the basal twisted segment. From the former species, it differs in having puberulent sheaths, and from both species by its rather wide glumes, as indicated by the specific epithet.

Stipa latiglumis has been collected in Yosemite Valley a number of times and is apparently not rare there. It is also known from the Sierra Nevada of Fresno County and from Mount San Jacinto in Riverside County. A list of all known collection localities is given at the end of this paper. In Yosemite Valley, *S. latiglumis* grows in scattered clumps on sandy or rocky soil at the foot of talus slopes at about 4,000 feet elevation, in mixed stands of oaks and coniferous trees. *Stipa elmeri* grows with it, but tends to occupy the sandy alluvial soils of the valley floor. *Stipa lemmonii* occurs on the talus above the valley floor. Thus *S. latiglumis* occupies a habitat somewhat intermediate between those of the other two species.

In the amount and length of foliar pubescence, width of leaf blades, number of ribs on the adaxial leaf surface, and shape of the floret, *S. latiglumis* is intermediate between *S. elmeri* and *S. lemmonii*. In other traits, *S. latiglumis* resembles either of the latter two species, as is shown in Table 1 and Figure 4. The only exceptions are in the length of ligule and length of lemma, in which *S. latiglumis* exceeds both of its parents. The high degree of morphological intermediacy and the intermediate habitat suggested that *S. latiglumis* might be of hybrid derivation from these two species.

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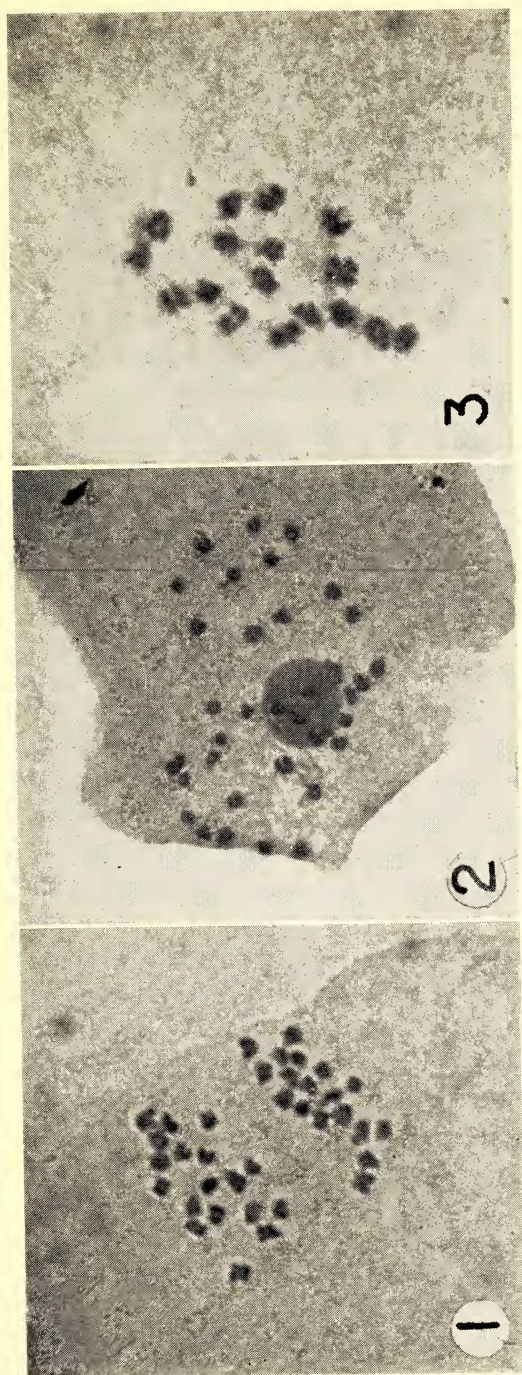
TABLE 1. MORPHOLOGICAL CHARACTERISTICS OF STIPA ELMERI, S. LATIGLUMIS, AND S. LEMMONII

CHARACTERISTICS	SPECIES		
	<i>S. elmeri</i>	<i>S. latiglumis</i>	<i>S. lemmonii</i>
Length of hairs on lowermost sheath (mm.)	0.7 ¹ 0.5-0.9	0.2 0.2-0.3	0.0
Length of ligule of lowermost culm leaf (mm.)	0.3 0.0-0.5	1.1 0.5-1.8	1.1 0.7-1.6
Length of ligule of uppermost culm leaf (mm.)	0.6 0.3-1.0	2.1 1.3-2.8	1.5 1.3-2.5
Pubescence of leaf blades adaxial surface/abaxial surface	hirsute hirsute	puberulent glabrous	puberulent glabrous
Width of lowermost culm blade (mm.) (From living specimens)	3.6-6.5	3.4-3.9	1.5
Cross-sectional shape of blade	flat	flat	involute
Number of ribs on adaxial leaf surface (From living specimens)	13-16	9-11	5-7
Number of nerves on first glume	3	3	5
Folded width of first glume (mm.)	1.0 0.7-1.1	1.6 1.3-1.9	1.6 1.2-1.8
Length of lemma (mm.)	7.3 6.5-8.0	8.2 7.5-9.0	6.1 5.5-8.0
Width of lemma (mm.)	0.8 0.8-1.0	1.2 1.0-1.5	1.2 1.0-1.4
Ratio of lemma length/lemma width	8.5 8.0-9.3	7.1 5.7-8.3	5.1 4.6-5.5
Length of hairs on basal awn segment (mm.)	1.0 0.7-1.1	1.0 0.5-1.3	less than 0.1

¹ Means and ranges of measurements are given. Measurements were made with a binocular microscope equipped with a micrometer eyepiece.

Living specimens of these three species were secured for cytological studies from the area of the Government Center in Yosemite National Park in July of 1952. The plants were grown in the greenhouses of the Genetics Department of the University of California at Berkeley. Fixations of anther material in 3:1 absolute alcohol—glacial acetic acid were made and chromosome numbers were determined from aceto-carmined squash preparations of pollen mother cells. Voucher specimens of the plants from which cytological materials were secured are preserved in the Herbarium of the University of California at Berkeley.

Gametic chromosome numbers of 18 were found in *S. elmeri* (fig. 1) and 17 in *S. lemmonii* (fig. 3). These are equivalent to the somatic num-



FIGS. 1-3. Chromosome plates of *Stipa*. FIG. 1. *S. elmeri*, anaphase, $\times 1560$ (Stebbins, Stutz and Pohl 7211), $n = 18$. FIG. 2. *S. latiglumis*, diakinesis, $\times 900$ (Stebbins et al 5114-2), $n = 35$. FIG. 3. *S. lemmonii*, metaphase I, $\times 1980$ (Stebbins et al 5117-5), $n = 17$.

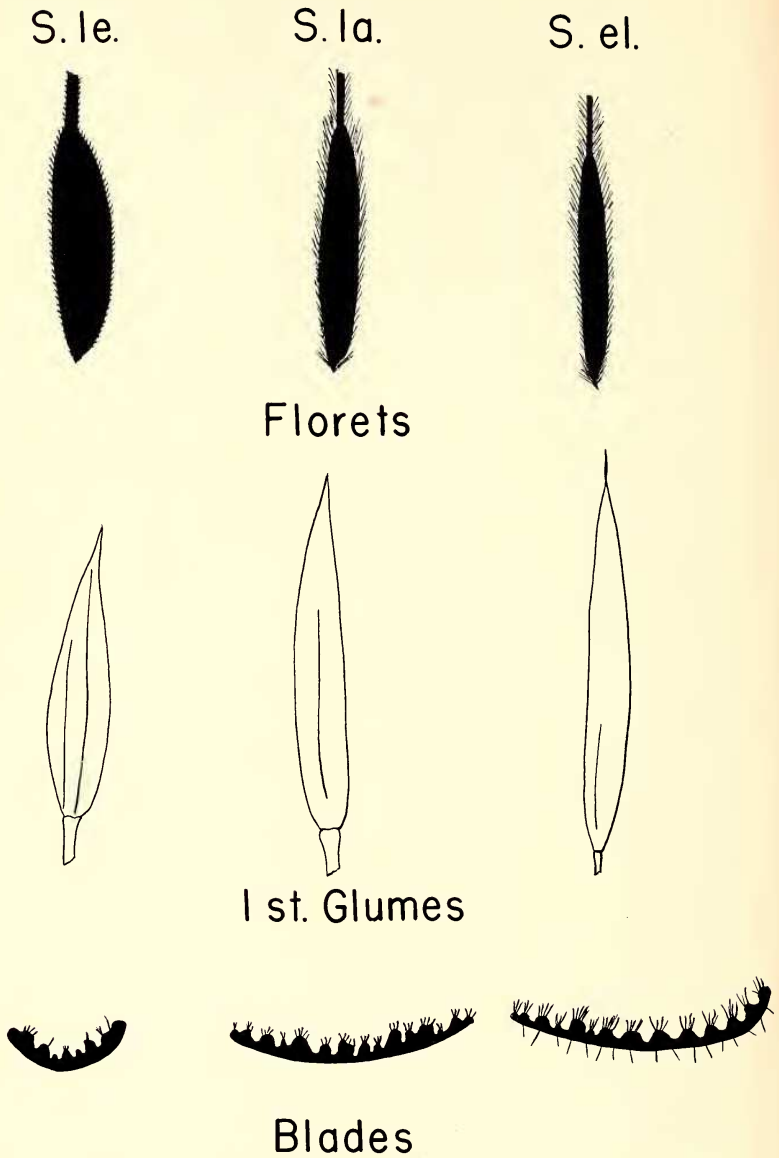


FIG. 4. Florets, first glumes, and leaf cross-sections of *S. lemmonii*, *S. latiglumis*, and *S. elmeri*.

ber of $2n=36$ determined for *S. elmeri* and $2n=34$ determined for *S. lemmonii* var. *jonesii* by Stebbins and Love (1941). Among the species of *Stipa* found in California, only *S. lepida*, *S. thurberiana*, and *S. lemmonii* var. *jonesii* are known to possess 34 chromosomes in the somatic comple-

ment. Neither *S. thurberiana* nor *S. lepida* is known to be present in the Yosemite area, and both differ from *S. latiglumis* in their morphological characteristics and may be excluded as possible parents of the putative hybrid.

The gametic chromosome number of *S. latiglumis* is 35 (fig. 2), equaling the sum of the gametic numbers of the local *S. elmeri* and *S. lemmonii* from Yosemite Valley. Meiotic pairing is apparently regular, although a small number of univalents appear to be present in some preparations. Two chromatin bridges have been observed at anaphase I in a number of sporocytes. Both herbarium specimens and living plants grown at Berkeley bear apparently normal seed.

It appears from the evidence furnished by gross morphology, habitat relationships and chromosome numbers, that *S. latiglumis* is an allopolyploid derivative of *S. elmeri* and *S. lemmonii*. Its fertility, its ability to breed true, and the relatively large size of its parafloral parts, can all be explained by its polyploid nature. Within Yosemite Valley, it appears to be fairly common. Because of the intense Pleistocene glaciation of the Valley, its tenancy there must be post-Pleistocene. It is very probable that it originated there in post-Pleistocene time. The isolated occurrences of this species from Fresno and Riverside counties may represent separate origins of this species from its parents, since each of these localities fall within the coincident ranges of the parental species.

Voucher specimens for chromosome counts. YOSEMITE NATIONAL PARK, CALIFORNIA. *Stipa elmeri*: forested alluvial valley fill below Bridal Veil Falls, October 26, 1952, *Stebbins, Stutz & Pohl* 7211. *Stipa latiglumis*: with *S. elmeri* in sandy, somewhat rocky soil in open forest of *Pinus ponderosa* and *Quercus kelloggii*, altitude 4,000 feet, in northwest part of residential area, Government Center, July 7, 1952, *Stebbins, Stutz & Zohary* 5114-2 and 5114-1. *S. lemmoni*: dry, rocky talus in shade of *Quercus chrysolepis*, altitude 4,100 feet, along horse trail immediately north of Government Center, July 7, 1952, *Stebbins, Stutz & Zohary* 5117-5.

Specimens of *S. latiglumis* examined. CALIFORNIA. Yosemite National Park: Camp Lost Arrow, altitude 4,000-4,500 feet, June 22, 1911, *Abrams* 4469 (DS, isotype); Yosemite Valley, *Bolander* 6099 (UC, US); Government Center, *Stebbins, Stutz & Zohary* 5114 (9 specimens) (UC, ISC); same locality and date, *Stebbins et al* 5116 (UC); Yosemite Valley, altitude 4,000 feet, June 25, 1911, *Jepson* 4280 (US, UC-J). Fresno County: 2.5 miles north of Pinehurst (Sec. 12, T. 14S, R. 27E.), altitude 5,500 feet, July 6, 1944, *Keck* 5373 (DS); Dunlop to Millwood, June 6-18, 1903, *Griffiths* 4680 (US). Riverside County: Idyllwild, Mount San Jacinto, small erect clumps, sandy pine woods, June 23, 1927, *Swalen* 656 (US).

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this study. The facilities of the Herbarium of the University of California were made available through the kindness of Dr. H. L. Mason, Director. The author wishes to thank the curators of the United States National Herbarium, the Dudley Herbarium, Stanford University, and the Herbarium of the California Academy of Sciences, San Francisco, for the opportunity of studying specimens from these collections.

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A NEW GRATIOLA FROM BOGGS LAKE, LAKE COUNTY, CALIFORNIA

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In April, 1923, J. W. Blankenship collected material of a species of *Gratiola* which he was unable to identify in the current manuals. He sent specimens to W. L. Jepson for identification. In the Jepson herbarium, the Blankenship specimens represent three collections all labeled "Kelseyville, Lake County." In one of these collections, that of May 21, 1929, Kelseyville is stricken out and "Bogg's Lake" inserted, presumably by Blankenship. Jepson drew up a description and gave the species a manuscript name descriptive of recurved pedicels, a character which in the Blankenship specimens apparently resulted from his failure to press the specimens immediately, for the pedicels are in reality erect. In the Jepson manuscript, there is pencilled the annotation in Jepson's handwriting, "any good?" which attests Jepson's later doubt as to the distinctness of his proposed species. Jepson apparently never saw the plants in the field. This species was rediscovered at Boggs Lake by the writers in 1953. Because of the inappropriateness and misleading character of the Jepson manuscript name, we do not adopt it but propose another.

The plants occur mostly as scattered individuals in the marginal waters of the seasonally receding shoreline of Boggs Lake at the west base of Mount Hanna in Lake County, California, at an elevation of 2900 feet. Often they stand out as single, erect, yellow-flowered individuals in a mass of the coarse, prostrate, white-flowered *Gratiola ebracteata* Benth. In only a few cases were the plants found aggregated in groups of more than one or two individuals. Such groups were in depressions made by the hoofs of cattle and might well reflect the aggregation and pressing into the mud of mature and still filled capsules of the previous season.

Gratiola heterosepala Mason & Bacigalupi sp. nov. A *Gratiola ebracteata* foliis superioribus obtusis nonnumquam emarginatis calyce in-